

Specialization among Off-Highway Vehicle Owners and its Relationship to Environmental Worldviews and Motivations

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EXECUTIVE SUMMARY: Off-Highway Vehicle (OHV) use is rapidly becoming one of the most difficult and contentious issues for federal, state, and local land management agencies to address. This article adds to a growing body of literature specific to the activity by addressing two distinct questions. First, do individuals' motivations for participating in OHV riding vary depending upon their level of specialization within the activity? Second, do OHV riders at varying levels of specialization hold significantly different beliefs about the environment? Data for this study come from a statewide survey of OHV owners in Utah. Drawing a sample from a state-provided list of registrations, 1,500 OHV riders were sent a survey instrument by mail. A total of 600 surveys were returned completed, the data from which are used in this analysis. The analysis identified three specialization groups, identified as low, medium, and high. Results were mixed for the association between OHV riders' specialization level and their motivations for participation. More highly specialized OHV riders exhibited stronger motivations for personal achievement and meeting, teaching, and leading others than did less specialized riders. The data also show no significant relationship between an OHV riders' level of involvement in the activity and their general level of environmental concern. Results do, however, show significant differences across specialization groups in the belief that humans are severely abusing the environment and that an ecological crisis is imminent. These findings can assist recreation managers and planners in several regards. First, OHV riders are a heterogeneous group of recreationists that vary in their behavior, skills, and commitment to the activity. These variations correspond to specific desired recreation experiences. Highly specialized riders desire a sense of personal achievement and a forum where they can teach and lead others. Recreation planners should be cognizant of these differences and provide OHV trails and areas that facilitate both skill development and the opportunity for riders to teach and meet with others. Secondly, recreation planners should realize general beliefs about the environment do not differ relative to an individual's level of engagement in the activity. Environmental education efforts therefore might not need to be targeted at any one specific type of OHV rider.

KEYWORDS: Recreation specialization, off-highway vehicle, New Ecological Paradigm, recreation experience preferences

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Off-Highway Vehicle (OHV) use on public lands has increased dramatically over the last several decades (Cordell, Betz, Green, & Owens, 2005). As use has increased, federal, state, and even local government agencies have become increasingly involved with OHV users through planning and public participation efforts. Given the increasingly important role OHV use is playing in the policy, planning, and management of recreation resources, a growing body of research is emerging to address the unique nature of OHV use and its users. This article adds to that literature by addressing two distinct questions. First, do individuals' motivations for participating in OHV riding vary depending upon their level of specialization within the activity? Second, do OHV riders at varying levels of specialization hold significantly different beliefs about the environment? Through this analysis, recreation planners may be more informed in their management decisions through an increased awareness to the diversity of OHV users, their motivations, and their environmental beliefs.

Knowing how recreationists differ can be an invaluable tool for recreation planners. Conflict often arises out of varied perceptions of appropriate resource use or behavioral norms (Schreyer, 1990). To this end, recreation research has frequently attempted to dissect user groups based on either behavioral or psychological characteristics. Recreation specialization is one such approach that can inform management about the diversity of users within an activity based upon cognitive, affective, and behavioral indicators. Given recreation specialization's theoretical robustness, it can be an informative tool to understand differences within OHV users.

The provision of high-quality recreation experiences can also be facilitated through an increased awareness of the motivations and attitudes of recreationists. With knowledge about OHV riders' motivations and attitudes, management and public outreach efforts can be specifically targeted to the unique desires and beliefs of recreationists. With this in mind, this research explored how leisure motivations and environmental attitudes differ across specialization groups. This line of inquiry is particularly useful to agencies and organizations attempting to meet the needs of a growing user group while simultaneously attempting to minimize the ecological and social impacts of that group's activity.

Related Literature

Recreation Specialization

Recreation specialization can either be defined as a measure of intensity of involvement in a particular recreational activity or as a developmental process that entails a progression of behavior, attitudes, and preferences (Scott & Shafer, 2001). For the purposes of this

research we approach the construct from the former perspective, while acknowledging the importance of research focused on the latter. With this in mind, we define recreation specialization as a multidimensional construct of activity involvement based upon an individual's behavior, his or her skill development and commitment to the activity.

The theoretical foundation of specialization assumes differences in behavior, attitudes, motivations, and preferences can be explained by variations in levels of involvement with the activity. The first studies to operationalize the construct were focused on explaining differing patterns of use and management preferences based upon length and intensity of involvement in an activity (Bryan, 1977). As recreationists' involvement in an activity changes, their preferences for settings and outcomes change as well. Given this connection, recreation specialization has been used to explore within activity differences in a variety of outdoor recreation activities (see Scott, Ditton, Stoll, & Eubanks [2005] and Scott & Shafer [2001] for comprehensive lists).

Specialization is intended to be a collective measure of an individual's involvement in an activity; as such the construct must be built upon multiple dimensions to be theoretically robust. The individual dimensions comprising recreation specialization have been explored in a variety of approaches. While the construct has no established or formal dimensions per se, it is generally agreed the specialization framework is multi-dimensional, being a product of recreationists' behavior, their skill development and knowledge, and their psychological commitment to the activity (Scott & Shafer, 2001). Some research, however, has conceptualized specialization as solely a behavioral construct (e.g., Ditton, Loomis, & Choi, 1992; Donnelly, Vaske, & Graefe, 1986; Martin, 1997) or as wholly psychological (e.g., McIntyre, 1989; Shafer & Hammitt, 1995). For the purposes of this paper, specialization will be conceptualized as a collective measure of behavior, skill development, and commitment to the activity.

Analyzing recreationists based on their level of involvement in an activity has shown differences in a variety of dependent variables including attachments to place (Bricker & Kerstetter, 2000), perceived crowding (Graefe, Donnelly, & Vaske, 1986), attitudes toward depreciative behavior (Kuentzel & McDonald, 1992; Wellman, Rogenbuck, & Smith, 1982), as well as a host of others (see Scott & Shafer, 2001). Specialization has also been used to analyze within activity differences in motivations for participation and environmental attitudes. We now focus specifically on previous research in these two areas.

Recreation Specialization and Motivations

The cognitive theory behind motivations assumes recreation is purposeful and goal-directed (Anderson, Nickerson, Stein, & Lee, 2000; Driver & Brown, 1978; Driver, Brown, Stankey, & Gregoire, 1987; Manfredo, Driver, & Tarrant, 1996). A recreationist's motivations represent specific needs that can be fulfilled through participation. As recreationists transition through the continuum of specialization and they become either more or less involved in the activity, it could be assumed that desired recreation experiences change as well. Past research generally supports this association. For example, a study of saltwater fishermen in Texas identified four distinct specialization groups that were found to differ in their motivations for participation (Ditton et al., 1992). Seven out of nine motivational items differed among the groups with more specialized recreationists identifying the following items as more important to them than less specialized recreationists: "to be outdoors," "to experience new and different things," "for relaxation," "to be close to the sea," "to get away from other people," "to experience natural surroundings," and "to get away from the demands of life." The authors suggest that specialization is highly related to motivation. More specifically, their findings show more specialized anglers tended to be less motivated by activity-specific elements of the experience (e.g., catching a certain number or size

of fish) relative to their less specialized counterparts. Rather, more specialized anglers preferred more non-activity-specific elements of the experience such as being outdoors or being with friends.

Further research exploring the dynamic relationship between specialization and motivation has shown similar results. For example, three distinct specialization groups were identified in a study of bird watchers in Thailand (Hvenegaard, 2002). The birdwatchers were classified as either novice, advanced-active, or advanced-experienced. Among these groups, seven out of 15 motivations for bird watching differed significantly. Somewhat similar findings were found in a study of birdwatchers in Canada; as level of involvement increased, so too did motivations for personal achievement (McFarlane, 1994). These results again suggest that as an individual's level of involvement within an activity changes, so too does their desired experiences.

A study of whitewater recreationists in Tennessee found the dimensions of specialization are related to specific motivations in distinct ways (Kuentzel & McDonald, 1992). The study operationalized three specialization dimensions, past experience, commitment, and lifestyle. These three dimensions were correlated to specific motivation in significantly different patterns. For example, the motivation item "to take chances" was positively correlated with a recreationists' commitment to the activity, yet it was negatively correlated to their past experience.

Other research lends support to this relationship and has been tested in a variety of recreational activities such as hiking (Viriden & Schreyer, 1988), hunting (Kuentzel & Heberlein, 1992), as well as other studies of birdwatchers (Cole & Scott, 1999; Marten, 1997). Taken as a whole, these previous studies reveal both theoretical and empirical backing for the concept that as individuals becomes more or less specialized (i.e., as their level of involvement changes) their desired recreation experiences change as well. Given this, we hypothesize motivations will differ across specialization levels; however, the direction and strength of those differences cannot be posited.

Recreation Specialization and General Environmental Beliefs

Specialization has been used to discern differences between recreationists on a variety of dependent variables involving environmental attitudes, concerns, and behaviors (Chipman & Helfrich, 1988; Dyck, Schneider, Thompson, & Viriden, 2003; Hvenegaard, 2002; Mowen, Williams, & Graefe, 1997; Oh & Ditton, 2008; Thapa, Graefe, & Meyer, 2006). Generally, a positive relationship has been noticed between recreationists' level of involvement in an activity and their concerns for the resources upon which their activity depends. Less support is found for the relationship between recreationists' level of involvement and their general environmental concern.

Recent research suggests recreation specialization, when considered with other constructs such as management support and activity-specific preferences, can be used to explain the formation of conservation attitudes and behaviors within the activity of recreational fishing (Oh & Ditton, 2008). Similarly, increased specialization has been positively related to increased environmental behaviors among SCUBA divers (Thapa, Graefe, & Meyer, 2006). Increased support for resource protection (Chipman & Helfrich, 1988; Hvenegaard, 2002) and low-impact practices (Dyck, Schneider, Thompson, & Viriden, 2003) has also been associated with higher levels of specialization. All of these studies were concerned with activity-specific environmental attitudes and behaviors. For example, in the study of recreational fishing, conservation behavior was measured by asking respondents about their compliance with fishing rules and regulations and in the SCUBA diving study respondents were asked whether or not they damaged the resource while diving.

Other research has utilized specialization in an attempt to understand general environmental concern rather than activity-specific resource conservation attitudes and behaviors. Results for these findings are not as consistent however. In a study of members of a U.S. mountaineering organization, general levels of environmental concern were not related to specialization level (Dyck, Schneider, Thompson, & Virden, 2003). Similarly, the specialization amongst trail users in the Mount Rogers National Recreation area was not significantly related to general environmental concern (Mowen, Williams, & Graefe, 1997).

General beliefs about the environment are complex and comprised of various dimensions, such as beliefs about population growth, human consumption of natural resources, and beliefs concerning humanity's ability to solve environmental problems with technological solutions. Given the mixed results concerning the specialization/environmental concern relationship, more definitive answers may reveal themselves if we analyze the specific dimensions of environmental beliefs. In our analysis, we'll not only look at the relationship between specialization and general environmental beliefs, we'll also examine potential variations in the dimensions of environmental beliefs with respect to specialization levels.

The mixed findings between activity-specific resource conservation attitudes and behaviors as opposed to general environmental attitudes suggest that as involvement increases, awareness of degradation toward specific resources increases but general levels of environmental concern do not change (Dunlap & Heffernan, 1975; Mowen, Williams, & Graefe, 1997; Wall, 1995). These findings lead us to hypothesize OHV riders' level of involvement in the activity is not related to general levels of environmental beliefs or to the respective dimensions of those beliefs.

Method

Data Collection

The data for this study come from a statewide survey of OHV owners in Utah conducted during the summer of 2007. Utah, like many other states in the western U.S., is at the forefront of dealing with increased levels of OHV use. In fact, the number of registered OHVs within the state increased by 233% between 1998 and 2006, from 51,686 to 172,231 registered vehicles (Burr, Smith, Reiter, Jakus, & Keith, 2008). With the number of registered vehicles increasing every year, many land managers and former managers have identified OHV use as reaching a "crisis stage" within the state (Fahys, 2007). These managers claim existing policies, reactive agency management strategies, and poor enforcement has led to "rude and threatening treatment of land officials, destruction of ecologically sensitive areas, [and a] refusal to stay on trails and damage to streambeds" (Fahys, 2007). Given both the nationwide relevance of increasing OHV use and the paucity of academic literature concerning the activity, the state of Utah serves as a good contextual reference from which the activity can be studied.

OHVs are defined by the state of Utah as 4-wheel drive jeeps, motorcycles designed for off-highway use, all-terrain vehicles (ATVs), and other specially designed off-road motor vehicles (e.g., dune buggies, rock crawlers, and sand rails). Street-legal SUVs and over snow machines such as snow-mobiles could also be considered in a broad definition of OHVs; however these vehicles are not within the scope of this research and have been excluded from analysis.

Utah requires all OHVs within the state be registered with the Department of Motor Vehicles. This list of registrations is theoretically a census of all the OHVs within the State. This list was refined, making probability of selection equal regardless of the number of

vehicles an individual owns. A random sample of 1,500 owners was drawn from this list; those individuals were sent the survey instrument, which was administered according to a modified Dillman Method (Dillman, 2000). Of the 1,500 surveys sent, 84 were returned either because the respondent had moved or because they had died since he or she last registered his or her OHV. In total, 1,416 Utah OHV owners received surveys, 600 of which were returned completed; this tabulates out to a 42.4% response rate. The response rate is below the recommended 60% level (Salant & Dillman 1994) and non-response bias was not checked in this study due to time and financial considerations. Both of these facts are limitations acknowledged by the authors.

Measurement of Specialization

As previously mentioned, we conceptualize specialization as a multidimensional construct consisting of recreationists' behavior, their skill development, and their commitment to the activity. However, there is no established process of operationalizing each of these dimensions. The variety of ways in which specialization has been measured can largely be attributed to doubt regarding what comprises each of the three dimensions themselves and whether specific variables reflect one dimension or another (Kuentzel & McDonald, 1992).

We measure the behavioral dimension through two variables: a respondent's total number of OHV-related trips taken over the previous 12 months, and the percentage of his or her life spent riding OHVs. The latter was determined by dividing the years an individual has spent riding by his or her age (see Needham, Vaske, Donnelly, & Manfredi, 2007). We avoid including equipment variables, which are often included in the behavioral dimension, in our construction of the specialization construct. This was done so as not to bias higher levels of involvement to include individuals with large amounts of discretionary income.

The skill dimension was also measured through two variables: a respondent's self-identified skill level on a 5-point Likert scale where 1 = beginner and 5 = expert, and a respondent's preferred level of trail difficulty on a 5-point Likert scale where 1 = easiest and 5 = extreme. Preference for trail difficulty is included because it solicits information about specific activity-related abilities (see Burr & Scott, 2005; Martin, 1997; Thapa et al., 2006). More specialized owners are assumed to prefer more difficult trail settings than less specialized owners.

The final dimension of specialization, commitment, is again measured through two variables: the total number of voluntary OHV organizations an individual belongs to (see Miller & Graefe, 2000; Oh & Ditton, 2006) and the number of routine annual trips to a particular place for a particular reason. For example, an OHV owner may travel every year to a specific area over Memorial Day weekend for a family reunion. We hypothesize this variable poses just as good a measure of involvement as membership in voluntary association groups. That being said, these two measures in no absolute way provide a comprehensive view into the affective dimension of OHV riding. Other measures revolving around the relationship of the activity to other areas of life would undoubtedly prove to be more comprehensive and applicable to measuring an individual's specialization level. Due to the constraints of survey development, however, these were not included in this research and are limitations acknowledged by the authors.

Measuring Motivations

Research on leisure motivations frequently employs items from a series of psychometric scales known as the recreation experience preference (REP) scales (Manfredi et al., 1996). We follow suit to measure the motivations of OHV riders within Utah. The REP scales are grounded in motivation theory, which posits that individuals recreate to attain certain

psychological and physical goals (Anderson, Nickerson, Stein, & Lee, 2000; Driver & Brown, 1978; Driver, Brown, Stankey, & Gregoire, 1987; Manfredi, Driver, & Tarrant, 1996). Each of the motivation items within the scales is categorized under a larger domain representing specific motivations. In total the REP scales represent 19 motivation domains (Moore & Driver, 2005).

A total of 21 items were selected from the REP scales for the purpose of this study. These items were selected to represent a wide range of motivations we conceptualized might influence OHV behavior. The 21 motivation items represent 7 of the 19 domains defined within the REP scales.

Measurement of Environmental Worldviews

Environmental worldview was measured through the New Ecological Paradigm scale. The original New Environmental Paradigm scale was introduced in 1978 and contained 12 statements geared toward assessing an individual's environmental attitudes, beliefs, and values (Dunlap & Van Liere, 1978). Subsequent work on the scale led to the addition of three statements and the name was changed to the New Ecological Paradigm scale (Dunlap, Van Liere, Mertig, & Jones, 2000). The New Ecological Paradigm scale is perhaps the most widely used measure of general levels of environmental awareness and concern. The revised instrument was utilized for this research.

The NEP scale operates by asking respondents to state their level of agreement, on a 5-point Likert scale, with 15 statements concerning the relationship between humans and the environment. The scale is grounded in a number of theories that came to scientific and public prominence during the '70s. Namely these involve a growing concern with unchecked population growth, the role of technology in solving environmental problems, the intrinsic rights of other species, and the ability of human activities to affect the balance of nature. These theories form the basis for the five dimensions that are thought to define general pro-environmental beliefs. The dimensions are: a belief that there is a limit to human population growth, a rejection of the belief that humans are exempt from the laws of nature, a rejection of the belief that humans were meant to rule over nature, a belief that there is a balance to nature, and a belief that humanity is severely abusing the environment. We analyze the scale as a singular measure of general environmental beliefs. We also analyze each of the dimensions of environmental beliefs independently. Further discussion on the scale's construction and criticisms levied against it can be found in much more detail elsewhere (e.g., Dunlap & Van Liere, 1978; Dunlap et al., 2000; Thapa, 2000; Thapa & Graefe, 2003; Theodori, Luloff, & Willits, 1998).

Results

Specialization Levels

To create a continuum of involvement, we summed standardized scores for each of the six specialization measures. Group identification was subsequently created by splitting the sample in thirds based upon this specialization index. This resulted in 164 OHV riders being identified as low specialists, 163 as medium specialists and another 164 as high specialists. The internal consistency of the scale was acceptable with a Cronbach's α of 0.63. As expected, the groups differed significantly across all six specialization measures (Table 1).

Kuentzel and McDonald (1992) note that conceptualizing the specialization construct as a singular item may "slight the complexity of the specialization process" (p. 269). We address this issue by presenting correlation coefficients between each of the specialization measures and the dependent variables (Table 2). These relationships are discussed in

Table 1. Comparison of Specialization Measures Across Groups.

Specialization measures	Specialization Group			<i>F</i> (sig.)	χ^2 (sig.)
	Low (<i>n</i> =164) <i>M</i> (<i>SD</i>)	Medium (<i>n</i> =163) <i>M</i> (<i>SD</i>)	High (<i>n</i> =164) <i>M</i> (<i>SD</i>)		
Behavior					
Total trips within the past 12 months	5.77 (4.70)	8.56 (9.94)	16.79 (17.96)	36.44***	N/A
Percentage of life spent riding	.23 (.20)	.47 (.23)	.62 (.20)	148.98***	N/A
Skill					
Self-assessed skill level	3.16 (.76)	3.81 (.58)	4.27 (.56)	N/A	191.80***
Preference for trail difficulty	1.61 (.57)	2.05 (.60)	2.77 (.73)	N/A	204.50***
Commitment					
Number of routine annual trips	.20 (.46)	.66 (.76)	1.16 (.60)	72.71***	N/A
Number of memberships in voluntary OHV organizations	.01 (.11)	.07 (.26)	.43 (.71)	43.32***	N/A

*** = Significant at the .001 level

Table 2. Bivariate Correlations Between Specialization Dimensions and Motivations for Riding and Environmental Beliefs.

	Behavior		Skill		Commitment	
	Total trips within the past 12 months	Percentage of life spent riding	Preference for trail difficulty	Self-assessed skill level	Number of memberships in voluntary OHV organizations	Number of routine annual trips
Motivations						
Personal						
Achievement	.17**	.20**	.34**	.15**	.07	.11*
Meet/Teach/Lead Others	.02	.04	.07	.13**	.08	.10*
Stress Relief	-.01	.11*	.05	.08	-.06	.06
Independence	-.02	.08	.09*	.14**	.01	.11*
Aesthetics and Place	.03	.03	-.08	.02	.04	.12**
Share Similar Values	-.01	-.02	-.01	.07	.07	.11*
Environmental Worldviews						
General Environmental Beliefs	.01	-.06	-.13**	-.05	-.08	-.01
Limits to Growth	.04	-.01	-.04	-.01	.01	.04
Anti-Exemptionalism	.07	.04	.02	-.03	-.02	-.07
Anti-Anthropocentricism	-.02	-.03	-.08*	-.05	-.06	-.01
Balance to Nature	-.01	-.07	-.18**	-.08	-.10*	-.03
Eco-Crisis	-.02	-.12**	-.18**	-.07	-.10*	-.01

* = Significant at the .05 level

** = Significant at the .01 level

further detail later. Displaying individual item correlations helps to display the lack of covariation that may be present among the disparate specialization measures. We did not notice any significant directional changes or unexpected variations through our analysis of these bivariate correlations (i.e., the significant relationships were either consistently positive or negative across all the measures). This lends support for our construction of the specialization construct as an aggregate of these six measures.

Differences between the groups' sociodemographic characteristics were mixed. The groups did differ significantly in their age ($F_{2,488} = 18.21, p \leq 0.001$), with less specialized riders tending to be younger than more specialized ones. The groups, however, did not differ in their level of educational attainment or in their income. Overall, the entire sample was predominantly white (98.4%), married (87.1%), and identified themselves as being politically conservative (59.5%).

Specialization and Motivations for Riding

While most research using the REP scales retains individual motivations within their "intended" domains for analysis (Manfredo et al., 1996), this is not always possible given concerns over survey instrument length and the desire to gather data on other user characteristics or constructs. Ideally, a suite of statement items concerning each theoretical motivational domain should be included in the survey instrument. This enables more robust confirmatory factor analysis procedures to be completed. In the absence of a set of statement items for each intended motivation domain, an exploratory principle components analysis is most appropriate (Kyle, Mowen, & Tarrant, 2004). This approach was employed in this research to determine the most distinct motivations within the data, and it also allowed a more formal mechanism by which we could place orphan motivations (i.e., they were the only statement representing a specific REP domain). We employed Varimax rotation to assist in defining the most distinct factors. In total, six factors were found in the data (as compared to the seven a priori dimensions) with eigenvalues greater than 1.0 (Knoke et al., 2002). These factors were nearly identical to the a priori domains and were identified as personal achievement, meet/teach/lead others, stress relief, independence, aesthetics and place, and sharing similar values (Table 3). After the exploratory principal components procedure, factor scores were computed for use in subsequent analysis. Factor scores are preferred because they represent the extent to which each individual is motivated by that specific factor (given the principal components analysis procedure removes the variance of the first component before estimating subsequent components) as opposed to summed index scores, which are calculated irrespective of the other motivations. An individual's preferred recreation experiences are undoubtedly composed of most, if not all, of the REP domains to a greater or lesser extent. Given this, we believe that factor scores are more theoretically justified relative to additive indexes in the case of recreation motivations.

Simple one-way ANOVAs were used to analyze differences among the specialization groups (Table 4). The personal achievement motivational factor yielded significant differences across groups. Fisher's LSD post-hoc tests show low-level specialists were significantly less motivated by personal achievement when compared to high level specialists ($p \leq .001$). Results also indicated a significant difference between the medium and high level specialists in their motivation for personal achievement ($p \leq .001$). These findings suggest high-level specialists, those OHV riders who go most frequently, see themselves as more advanced riders, and are comparatively highly committed to the activity, are motivated more by personal achievement than either of the other specialization groups. Further analysis reveals a significant and positive correlation between motivations for personal achievement and five out of the six specialization measures (Table 2).

Table 3. Descriptive Statistics and Factor Loadings of Recreation Experience Preferences.

Motivation Factor and Items	<i>M</i>	<i>SD</i>	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
Personal achievement								
Do something challenging	3.78	1.01	.816	.157	.101	.106	.073	.135
Experience excitement	4.02	0.98	.816	.102	.172	.124	.182	.102
Develop my skills and abilities	3.80	1.05	.784	.274	.151	.171	.075	.171
Test the capabilities of my vehicle	3.25	1.19	.753	.297	.146	.222	-.099	.066
Experience new and different things	4.04	0.91	.637	.139	.048	.221	.370	.150
Meet/Teach/Lead Others								
Help others develop their skills	3.69	0.96	.200	.592	.047	.466	.124	.350
Share what I have learned with others	3.82	0.93	.157	.596	.064	.417	.182	.356
Lead other people	3.35	1.02	.251	.686	.047	.317	.132	.246
Talk to new and varied people	3.31	1.06	.235	.845	.095	-.016	.133	.048
Observe other people in the area	3.06	1.15	.166	.850	.091	-.062	.052	.058
Stress Relief								
Get away from the demands of life	4.61	0.67	.129	.018	.760	.104	.220	.217
Experience personal Freedom	4.48	0.76	.243	.032	.791	.114	.124	.110
Experience solitude	4.30	0.86	-.007	.077	.744	.127	.301	.027
Release or reduce built-up tension	4.23	0.92	.180	.163	.772	.193	-.047	.049
Independence								
Do things my own way	3.70	1.03	.281	.087	.249	.788	.066	.015
Be in control of things that happen	3.90	1.01	.249	.093	.245	.809	.131	.063
Aesthetics & Place								
Enjoy natural scenery	4.68	0.64	-.061	.005	.426	-.019	.657	.160
Enjoy a place that is special to me	4.30	0.84	.302	.089	.297	.117	.646	.079
Learn more about the natural history of an area	3.95	0.94	.161	.305	.048	.147	.757	.056
Share Similar Values								
Be with others who enjoy the same activities as I do	4.26	0.92	.239	.231	.146	.044	.118	.807
Be with members of my group	4.28	0.91	.148	.146	.181	.070	.091	.847
Eigenvalue								
Percentage of total variance explained			7.99	2.38	1.68	1.19	1.12	1.01
Cronbach's α (reliability)			0.89	0.88	0.83	0.87	0.67	0.82

Note. Means are based on a 5-point Likert scale where 1=not important at all and 5=very important. 73.2% of variance explained.

Table 4. Comparison of Specialization Measures Across Groups.

Specialization measures	Specialization Group			F (sig.)
	Low	Medium	High	
Motivations				
Personal Achievement	a	b	ab	18.63***
Meet/Teach/Lead Others	a		a	4.21*
Stress Relief				1.74
Independence				2.02
Aesthetics and Place				0.23
Share Similar Values				0.29
Environmental Worldviews				
General Environmental Beliefs	a		a	1.86
Limits to Growth				0.70
Anti-Exemptionalism				0.72
Anti-Anthropocentrism				0.30
Balance to Nature	a		a	2.83
Eco-Crisis	a		a	4.24*

Note. Similar letters between groups indicate significant differences at the .05 level.

* = Significant at the .05 level

*** = Significant at the .001 level

The meet/teach/lead others motivational factor also yielded significant differences across groups. Post-hoc tests reveal the low specialists are significantly less motivated by meeting, teaching, and leading others than the highly specialized users. The Pearson's correlation coefficients between the meet/teach/lead others factor score and the specialization measures show OHV riders who perceive their skill level to be high tend to be more motivated by social factors. The correlations also reveal riders who make more routine annual trips to specific places tend to be motivated by social factors as well.

No other significant motivational differences were noted across specialization groups. Several interesting correlations did appear in the remaining motivational factors however. Findings show that as skill level increases (both in self-assessed skill level and in preference for trail difficulty), the motivation to experience independence increased as well. Findings also show a positive relationship between the number of routine annual trips an OHV rider takes and their motivations for independence, to experience aesthetics and place, and to be with others who share similar values as they do.

Taken as a whole, the analysis of motivations across specialization groups yielded mixed results. One distinctive pattern that can be seen however is that as specialization level increases so too does both personal and social motivations. One might expect less specialized riders to be motivated more by social influences than personal ones. However, the data show this is not the case as significant differences were noted in similar patterns for both the personal achievement motivations as well as the more social motivation of meeting, teaching, and leading others.

Specialization and Environmental Worldviews

We reverse coded every other item on the NEP scale so higher scores consistently corresponded to stronger beliefs about the environment. We created a summed index of all

15 scale items and use it as a measure of the strength of environmental beliefs. The overall scale's reliability was more than adequate (Cronbach's $\alpha = 0.85$) justification for using a summed index. We also created summed indexes for each of the five dimensions thought to comprise a pro-environment worldview. Reliability measures across all five of these dimensions are shown in Table 5. Each of the five dimension scores as well as the general environmental belief scores were then analyzed across specialization groups.

Results confirm our hypothesis of no significant differences in general environmental beliefs across specialization levels (Table 4). Four of the five dimensions of environmental beliefs were also not significantly different across specialization levels. However, specialization groups did differ in their belief that humanity is severely abusing the environment. Post-hoc tests reveal the difference is between low specialists and high specialists with low specialists holding significantly stronger beliefs that humans are abusing the environment and that an ecological crisis may be imminent.

Table 5. Descriptive Statistics and Factor Loadings of Environmental Attitude Scale Items.

Dimension and Statement	<i>M</i>	<i>SD</i>	Cronbach's α
Limits to Growth	2.64	0.03	0.45
We are approaching the limit of the number of people the Earth can support	2.66	1.29	
The earth has plenty of natural resources if we just learn how to develop them	3.81	1.11	
The earth has a finite amount of room and resources	3.07	1.27	
Anti-Exemptionalism	3.54	0.03	0.41
Despite our special attributes, humans are still subject to the laws of nature	4.23	0.79	
Humans will eventually learn enough about how nature works to be able to control it	2.48	1.12	
Human ingenuity will insure that we do not make the Earth unlivable	3.13	1.12	
Anti-Anthropocentrism	3.42	0.04	0.67
Humans have the right to modify the natural environment to suit their needs	2.65	1.26	
Humans were meant to rule over the rest of nature	2.88	1.37	
Plants and animals have as much right as humans to exist	3.80	1.25	0.67
Balance to Nature	3.39	0.04	
The balance of nature is strong enough to cope with the impacts of modern industrial nations	2.64	1.10	
When humans interfere with nature, it often produces disastrous consequences	3.31	1.30	
The balance of nature is delicate and easily upset	3.54	1.15	
Ecological Crisis	2.90	0.04	0.78
The so-called "ecological crisis" facing humankind has been greatly exaggerated	3.33	1.18	
Humans are severely abusing the environment	3.16	1.28	
If things continue on their present course, we will soon experience a major ecological catastrophe	2.87	1.23	

Note. Grand mean = 3.18; Cronbach's $\alpha = 0.85$

We subsequently analyzed bivariate relationships between each of the specialization measures and the environmental worldview variables to see if this more finely tuned analysis yielded more valuable information. Results are displayed in Table 2. Results show riders who prefer more difficult trials are less likely to hold pro-environmental beliefs; this relationship was significant for three of the five environmental belief dimensions. The data also show that those individuals who belong to a voluntary OHV organization are less likely to believe that humans are severely abusing the environment or that there is a balance to nature. Results also show that as the proportion of a riders' life spent riding increases, so too does their disagreement with the belief that humans are abusing the environment. These findings are sporadic at best, and lend support to the hypothesis that there is no consistent relationship between measures of involvement in OHV riding and the dimensions that comprise an individual's general beliefs about the environment.

Discussion

Previous research has employed the construct of specialization as an instrument to better understand within-activity differences; subsequently enabling managers to better understand the user group and its needs. Through our analysis we have shown Utah's OHV user group is a heterogeneous group that differs in their levels of specialization. More specifically, they differ in their behavior, their level of skill attainment, and their commitment to the activity.

This study set out to assist recreation planners and land management agencies by exploring the relationship between OHV riders' level of recreation specialization and their motivations for participation. Only two of the six identified motivation factors were significantly different across specialization levels. More specialized OHV riders tended to indicate stronger motivations for personal achievement and meeting, teaching, and leading others. These findings are congruent with the results found in previous literature. Two similar patterns were found between our results and those of previous studies. First, McFarlane (1994) and Hvenegaard (2002) note motivations for personal achievement are consistently and significantly positively related to higher levels of specialization. Second, Ditton et al. (1992) found both personal and social motivations increased with specialization levels. While these trends are significant throughout the literature, they are not universal to all previous studies. Regardless of the extent to which specialization is coupled with motivations, our findings lend support to the hypothesis that personal achievement motivations tend to be associated with higher levels of specialization.

The construct of specialization enables a mechanism by which we can address the question of whether an individual's level of involvement with an activity is related to his or her level of environmental concern. While previous research suggests recreationists' concern for the environment upon which their activity depends increases with their level of involvement, little support is found for whether that concern extends to general levels of environmental concern as well. Our findings suggest that among our sample of OHV riders this is not the case, as respondents' environmental worldviews did not differ regardless of specialization level. By testing the relationship between recreation specialization and environmental beliefs through both ANOVAs, which looks for differences across groups, and bivariate correlations, which look at the relationship between specific measures, our analysis was consistent with the existing literature in showing no signs of any strong and consistent relationship between the two constructs.

Our analysis also tried to discern more subtle relationships by analyzing the five dimensions thought to comprise an individual's environmental worldview. This attempt, however, didn't yield any more insightful information. Future research may consider using a respondent's general levels of environmental concern as a mediating variable through

which his or her perceptions of resource degradation may be formed. Our findings, along with the existing literature, would lend little support for any mediating effect. A distinct need also exists for future research to not focus solely on general environmental beliefs, but rather to examine recreationists' attitudes toward their activities' impact on the environment. More understanding is needed between the direct links between individuals' attitudes toward their activity and their impact on the environment.

For the conclusion of this paper, we note some of the research's limitations and then turn our attention to how the findings of this study can better inform managers and planners of OHV use areas. In regard to limitations, several issues need to be addressed. First, the response rate to the mail back questionnaire is below the 60% typically suggested in public mail surveys (Salant & Dillman, 1994). Non-response bias, however, is expected to be minimal, given the target population represents a narrow slice of the general population. Recent research has even suggested different response rates have a minimal effect on response bias (Curtin, Presser, & Singer, 2000; Keeter, Miller, Kohut, Groves, & Presser, 2000). Regardless, these are limitations acknowledged by the authors. Also, our findings are generalizable only to the population of OHV owners in Utah. Significant cultural and sociodemographic characteristics in other areas of the country are likely to influence both motivations for leisure participation and environmental attitudes. Secondly, our sample is drawn from a collective of OHV owners regardless of the type of vehicle that is used most often. For example, off-road motorcyclists and all terrain vehicle owners are included in the same sample. This is only a minimal limitation as different types of OHVs rely on the same resources and many OHV owners own multiple types (e.g., they may own several all-terrain vehicles as well as a dune-buggy).

Despite the study limitations, we feel there are still several key points from our findings that can assist managers and planners. First, OHV riders are a heterogeneous group of recreationists that vary in their behavior, skills, and commitment to the activity. These variations correspond to specific desired recreation experiences. Highly specialized riders desire a sense of personal achievement and a forum where they can teach and lead others. Recreation planners should be cognizant of these differences and provide OHV trails and areas that facilitate both skill development (i.e., varied levels of trail difficulty) and the opportunity for riders to teach and meet with others (i.e., group facilities and areas for teaching riding skills). Many agencies and OHV-riding organizations have already begun to realize the different needs and desires within the OHV-riding population. For example, the Canyon Country 4x4 Club and the Utah/Arizona OHV club, two voluntary association groups centered in the extreme southern part of the state, have worked in conjunction with the Bureau of Land Management's Kanab Field Office to construct, designate, and monitor a large system of trails in the region (Bureau of Land Management, 2008). The system includes trails of varying difficulty to accommodate a variety of OHV riders from younger children to the most experienced and adventurous. Such diverse systems logically enable a wider variety of needs and motivations, such as personal achievement and meeting, teaching, and leading others, to be met. This is just one example of how the diverse population of riders that OHV use attracts is beginning to be addressed by recreation planners and managers.

Our second management implication revolves around management actions aimed at increasing environmental awareness and sensitivity to ecological impacts. Efforts of this type have now become standard components of managing OHV use. For example, in its most recent OHV management guidelines, the Bureau of Land Management notes a "key action item" is to "maintain a public outreach campaign promoting a new OHV user ethic to respect public land resources" (2001, p. 8). Our findings from utilizing the NEP scale to assess OHV riders' general environmental worldviews suggest riders' general beliefs

about the environment do not tend to differ relative to an individual's level of engagement in the activity. Environmental education efforts therefore might not need to be targeted at any one specific type of OHV rider (e.g., the very experienced or the unskilled beginner). In conclusion, understanding how recreationists' level of involvement relates to their motivations for participation and beliefs about the environment can be an informative line of inquiry for recreation scholars and resource managers.

References

- Anderson, D. H., Nickerson, R., Stein, T. V., & Lee, M. E. (2000). Planning to provide community and visitor benefits from public lands. In W. C. Gartner, & D. W. Lime (Eds.), *Trends in outdoor recreation, leisure, and tourism* (pp. 197-211). New York: CABI Publishing.
- Bricker, K. S., & Kerstetter, D. L. (2000). Level of specialization and place attachment: An exploratory study of whitewater recreationists. *Leisure Sciences*, 22(4), 233-257.
- Bryan, H. (1977). Leisure value systems and recreation specialization: The case of trout fishermen. *Journal of Leisure Research*, 9(3), 174-187.
- Bureau of Land Management. (2001). *A management approach to off-highway vehicle (OHV) use on public land in Utah: Overview and specific agency actions*. U.S. Department of the Interior.
- Bureau of Land Management. (2008). OHV system. Retrieved March 14, 2008, from http://www.blm.gov/ut/st/en/fo/kanab/recreation/ohv_system.html.
- Burr, S. W., & Scott, D. (2005). Application of the recreation specialization framework to understanding visitors to the Great Salt Lake Bird Festival. *Event Management*, 9, 27-37.
- Burr, S. W., Smith, J. W., Reiter, D. K., Jakus, P., & Keith, J. (2008). *Recreational off-highway vehicle use on public lands within Utah*. Institute for Outdoor Recreation and Tourism, Utah State University.
- Chipman, B. D., & Helfrich, L. A. (1988). Recreation specialization and motivations of Virginia river anglers. *North American Journal of Fisheries Management*, 8(4), 390-398.
- Cole, J. S., & Scott, D. (1999). Segmenting participation in wildlife watching: A comparison of casual wildlife watchers and serious birders. *Human Dimensions of Wildlife*, 4(4), 44-61.
- Cordell, H. K., Betz, C. J., Green, G., & Owens, M. (2005, September 6). Off-highway vehicle recreation in the United States, regions, and states: A national report from the national survey on recreation and the environment (NSRE). Retrieved January 24, 2009, from http://www.fs.fed.us/recreation/programs/ohv/OHV_final_report.pdf.
- Curtin, R., Presser, S., & Singer, E. (2000). The effects of response rate change on the index of consumer sentiment. *Public Opinion Research*, 64, 413-428.
- Dillman, D. A. (2000). *Mail and internet surveys: The tailored design method* (2nd ed.). New York: Wiley.
- Ditton, R., Loomis, D., & Choi, S. (1992). Recreation specialization: Re-conceptualization from a social worlds perspective. *Journal of Leisure Research*, 24(1), 33.
- Donnelly, M., Vaske, J., & Graefe, A. (1986). Degree and range of recreational specialization: Toward a typology of boating related activities. *Journal of Leisure Research*, 18(2), 81-95.
- Driver, B. L., & Brown, P. (1978). *The opportunity spectrum concept in outdoor recreation supply inventories: A rationale*. Proceedings of the integrated renewable resource inventories workshop. USDA Forest Service General Technical Report RM-55, 24-31.

- Driver, B. L., Brown, P. J., Stankey, G. H., & Gregoire, T. G. (1987). The ROS planning system: Evolution, basic concepts, and research needed. *Leisure Sciences, 9*, 201-212.
- Dunlap, R. E., & Heffernan, R. B. (1975). Outdoor recreation and environmental concern: An empirical examination. *Rural Sociology, 40*(19-30).
- Dunlap, R. E., & Van Liere, K. D. (1978). The "new environmental paradigm": A proposed measuring instrument and preliminary results. *Journal of Environmental Education, 9*, 10-19.
- Dunlap, R. E., Van Liere, K. D., Mertig, A. G., & Jones, R. E. (2000). Measuring endorsement of the new ecological paradigm: A revised NEP scale. *Journal of Social Issues, 56*(3), 425-442.
- Dyck, C., Schneider, I., Thompson, M., & Virden, R. (2003). Specialization among mountaineers and its relationship to environmental attitudes. *Journal of Park and Recreation Administration, 21*(2), 44-62.
- Fahys, J. (2007, June 29). OHV abuse of public lands at crisis stage. The Salt Lake Tribune. Retrieved March 2, 2008, from www.sltrib.com.
- Graefe, A., Donnelly, M., & Vaske, J. (1986). Crowding and specialization: A reexamination of the crowding model. In Proceedings of the national wilderness research conference: Current research (pp. 333-338). Ogden, UT: General Technical Report INT-212, USDA Forest Service, Intermountain Research Station.
- Hvenegaard, G. T. (2002). Birder specialization differences in conservation involvement, demographics, and motivations. *Human Dimensions of Wildlife, 7*(1), 21-36.
- Keeter, S., Miller, C., Kohut, A., Groves, R. M., & Presser, S. (2000). Consequences of reducing nonresponse in a national telephone survey. *Public Opinions Research, 64*, 125-148.
- Knoke, D., Bohrnstedt, G. W., & Mee, A. P. (2002). *Statistics For social data analysis* (4th ed.). Belmont, CA: Wadsworth/Thomson Learning.
- Kuentzel, W. F., & Heberlein, T. A. (1992). Does specialization affect behavioral choices and quality judgments among hunters? *Leisure Sciences, 14*, 211-226.
- Kuentzel, W. F., & McDonald, C. D. (1992). Differential effects of past experience, commitment, and lifestyle dimensions on river use specialization. *Journal of Leisure Research, 24*(3), 269-287.
- Kyle, G. T., Mowen, A. J., & Tarrant, M. (2004). Linking place preferences with place meaning: An examination of the relationship between place motivation and place attachment. *Journal of Environmental Psychology, 24*(4), 439-454.
- Manfredo, M. J., Driver, B., & Tarrant, M. A. (1996). Measuring leisure motivation: A meta-analysis of the recreation experience preference scales. *Journal of Leisure Research, 28*(3), 188.
- Martin, S. R. (1997). Specialization and differences in setting preferences among wildlife viewers. *Human Dimensions of Wildlife, 2*(1), 1-18.
- McFarlane, B. L. (1994). Specialization and motivations of birdwatchers. *Wildlife Society Bulletin, 22*, 361-370.
- McIntyre, N. (1989). The personal meaning of participation: Enduring involvement. *Journal of Leisure Research, 21*(2), 167-179.
- Miller, C. A., & Graefe, A. R. (2000). Degree and range of specialization across related hunting activities. *Leisure Sciences, 22*(3), 195-204.
- Moore, R. L., & Driver, B. L. (2005). *Introduction to outdoor recreation: Providing and managing natural resource based opportunities*. State College, PA: Venture.
- Mowen, A. J., Williams, D. R., & Graefe, A. R. (1997). *Specialized participants and their environmental attitudes: re-examining the role of "traditional" and psychological specialization*. General Technical Report - Northeastern Forest Experiment Station, USDA Forest Service, (NE-232), 134-138.

- Needham, M. D., Vaske, J. J., Donnelly, M. P., & Manfredi, M. J. (2007). Hunting specialization and its relationship to participation in response to chronic wasting disease. *Journal of Leisure Research, 39*(3), 413-437.
- Norusis, M. (2005). *SPSS 14.0 statistical procedures companion*. Upper Saddle River, NJ: Prentice Hall.
- Oh, C., & Ditton, R. B. (2006). Using recreation specialization to understand multi-attribute management preferences. *Leisure Sciences, 28*, 369-384.
- Oh, C., & Ditton, R. B. (2008). Using recreation specialization to understand conservation support. *Journal of Leisure Research, 40*(4), 556-573.
- Salant, P., & Dillman, D. A. (1994). *How to conduct your own survey*. New York: Wiley.
- Schreyer, R. (1990). Conflict in outdoor recreation. In J. Vining (Ed.), *Social science and natural resource management*. Boulder, CO: Westview.
- Scott, D., Ditton, R. B., Stoll, J. R., & Eubanks Jr., T. L. (2005). Measuring specialization among birders: Utility of a self-classification measure. *Human Dimensions of Wildlife, 10*(1), 53-74.
- Scott, D., & Shafer, C. S. (2001). Recreational specialization: A critical look at the construct. *Journal of Leisure Research, 33*(3), 319-343.
- Shafer, C. S., & Hammitt, W. E. (1995). Purism revisited: Specifying recreational conditions of concern according to resource intent. *Leisure Sciences, 17*, 15-30.
- Thapa, B. (2000). *The association of outdoor recreation activities and environmental attitudes and behaviors among forest recreationists*. Unpublished doctoral dissertation, The Pennsylvania State University.
- Thapa, B., & Graefe, A. (2003). Forest recreationists and environmentalism. *Journal of Park & Recreation Administration, 21*(1), 75-103.
- Thapa, B., Graefe, A. R., & Meyer, L. A. (2006). Specialization and marine based environmental behaviors among SCUBA divers. *Journal of Leisure Research, 38*(4), 601-615.
- Theodori, G. L., Luloff, A. E., & Willits, F. K. (1998). The association of outdoor recreation and environmental concern: Reexamining the Dunlap-Heffernan thesis. *Rural Sociology, 63*(1), 94-108.
- USDA Forest Service. (1990). *ROS Primer and Field Guide*. Washington, D.C.: Author.
- Virden, R. J., & Schreyer, R. (1988). Recreation specialization as an indicator of environmental preference. *Environment and Behavior, 20*(6), 721-739.
- Wall, G. (1995). General versus specific environmental concern: A Western Canada case. *Environment and Behavior, 27*(3), 294-316.
- Wellman, J. D., Rogenbuck, J. W., & Smith, A. C. (1982). Recreation specialization and norms of depreciative behavior among canoeists. *Journal of Leisure Research, 14*, 323-340.